# AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

| 1. CONTRACT ID CODE | PAGE OF PAGES |
|---|---|
| J | 1 2 |

| 2. AMENDMENT/MODIFICATION NO. | 3. EFFECTIVE DATE | 4. REQUISITION/PURCHASE REQ. NO. | 5. PROJECT NO.(If applicable) |
|---|---|---|---|
| 0005 | 03-Mar-2004 | W68MD9-3295-4333 | |

| 6. ISSUED BY | CODE | 7. ADMINISTERED BY (If other than item 6) | CODE |
|---|---|---|---|
| USA ENGINEER DISTRICT, SEATTLE<br>ATTN: CENWS-CT<br>4735 EAST MARGINAL WAY SOUTH<br>SEATTLE WA 98134-2329 | W912DW | See Item 6 | |

| 8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code) | | |
|---|---|---|
| | X | 9A. AMENDMENT OF SOLICITATION NO. W912DW-04-R-0007 |
| | X | 9B. DATED (SEE ITEM 11) 27-Jan-2004 |
| | | 10A. MOD. OF CONTRACT/ORDER NO. |
| | | 10B. DATED (SEE ITEM 13) |
| CODE / FACILITY CODE | | |

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [ ] is extended, [X] is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

TITLE: DESIGN BUILD ELECTRICAL UPGRADE, HOWARD HANSON DAM, WASHINGTON

THIS AMENDMENT (0005) PROVIDES FOR THE FOLLOWING CHANGE:

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

| 15A. NAME AND TITLE OF SIGNER (Type or print) | | 16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)<br>TEL: EMAIL: | |
|---|---|---|---|
| 15B. CONTRACTOR/OFFEROR<br>_____<br>(Signature of person authorized to sign) | 15C. DATE SIGNED | 16B. UNITED STATES OF AMERICA<br>BY _____<br>(Signature of Contracting Officer) | 16C. DATE SIGNED<br>03-Mar-2004 |

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

**SUMMARY OF CHANGES**

PROJECT: W912DW-04-R-0007, Electrical Power Line Upgrade, Howard Hanson Dam, WA

AMENDMENT NO. FIVE

A. This amendment provides for the following changes:

(1) Revision to Section 00890, Outline Specifications, page 00890-6.
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B. The attached revised specification sections supersede and replace the corresponding specification sections. Specification changes are generally identified, for convenience, by strikeout for deletions, and underlining of text for additions. All portions of the revised or new pages shall apply whether or not changes have been indicated.

C. The proposal submittal time and date March 5, 2004 at 2:00 p.m. remains unchanged

D. NOTICE TO OFFERORS: Offerors must acknowledge receipt of this amendment by number and date on offer or by telegram. Please mark outside of envelope in which your office is enclosed to show amendment received.

Encl:
Revision Section 00890

(End of Summary of Changes)

# SECTION 00890

# OUTLINE SPECIFICATIONS

## TABLE OF CONTENTS

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# SECTION 00890

# OUTLINE SPECIFICATIONS

## 1.0 GENERAL

a. Purpose

The outline specifications listed hereinafter generally cover the range of products/work to be included in the project. The goals are:

- To indicate the areas of work in this project.
- To broadly indicate the work within each section.
- To indicate minimum acceptable requirements and to further detail the minimum requirements.
- To indicate a required or pertinent part of a specific guide specification.

These outline specifications do not attempt to address product approval, shop drawings, actual installation, or other items covered in the referenced specifications.

b. Prescriptive Requirements

Where a referenced UFGS section outline narrative contains specific edited or annotated passages from the guide section or other criteria which precludes use of other alternate choice(s) within the guide specification section this prescriptive requirement shall be mandatory and the other respective choices, materials or products shall be deleted from the specification requirements.

c. Editing of Guide Specifications

Refer to Section 00820 STATEMENT OF WORK under Attachment 1, Technical Specifications for procedure for incorporating the guide specifications into the contract documents.

## 2.0 SPECIFICATIONS

Guide specifications listed below and identified by TM, TI, or UFGS are available as specified herein. (Where more than one version of a UFGS is available, use the Army version, usually identified with an “A” at the end of the section number.) These specifications are issued by the Office of the Chief of Engineers. The Contractor is to be aware that these specifications represent the latest versions available at the time of issue of this RFP and are to be used in preparing specifications for this project. Specifications are available in electronic format where noted below.

- Uniform Facility Guide Specifications (UFGS).

http://www.ccb.org/docs/ufgshome/UFGSToc.htm

## DIVISION 2: SITEWORK

### 02220 Demolition

All demolition work shall conform to EM 385-1-1 U.S. Army Corps of Engineers Safety and Health Requirements Manual. Work includes demolition, removal, and disposal of all existing distribution system materials. Burning and explosives shall not be permitted. Equipment and labor necessary to safely demolish and remove the existing aerial distribution system shall be provided.

### 02231 Clearing and Grubbing

The Contractor shall dispose of all organic material other than saleable timber resulting from clearing operations by one or more of the following methods:

a. Waste Site. Debris shall be disposed of at a legal location outside of Government-controlled land. Contractor shall obtain approval of haul route and disposal site.

b. Chipping. Chipping of woody matter shall be done by machines. Wood chips larger than 6 square inches and thicker than 1/2 inch shall be disposed of in accordance with paragraph "a. Waste Site." Smaller sized woody matter may be disposed of by spreading the chips uniformly over selected areas within the project right of way, as directed, in loose layers not more than 3 inches in thickness.

Cut off flush with or below the original ground surface trees, stumps, roots, brush, and other vegetation in areas to be cleared, except for trees and vegetation indicated or directed to be left standing.

Grubbing will not be required in cleared areas.

All timber except saleable timber removed from the project site shall become the property of the Contractor. Saleable timber shall conform to the following specification:

Saleable Timber (Para 3.6.1)

Consider felled timber from which saw logs and fuelwood can be produced as saleable timber. Sawlogs and fuelwood will remain the property of either the Government or City of Tacoma, depending on location within the project right of way. This saleable timber shall be stockpiled on sites in areas free of debris where it does not interfere with the construction project and will be accessible (within 50 feet of the road) at a later date.

Logs shall be sorted by size and placed in separate decks for sawlogs and fuelwood. Trees shall be cut from the stump and limbed to the top before decking. Whenever possible logs shall be left in tree length. If trees are too large to be handled tree length, cut 40-foot logs plus 12 inches trim allowance from the butt. The minimum size for a sawlog is 6 inches Diameter Inside Bark (DIB) on the small end and 16 foot in length. All logs not suitable for sawlogs shall be placed in a fuelwood deck. The minimum size for a fuelwood log is 5 inches diameter on the large end and 8 feet in length.

**02231 Clearing and Grubbing (Cont.)**

Roads and Utility Lines;
Roads shall be kept free of debris at all times. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. Existing utility lines shall be protected from damage until the new line begins supplying power to the project. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations.

**02316 Excavation, Trenching, and Backfilling for Utility Systems**

The Contractor shall perform excavation, preparation of pipe-laying surface, pipe bedding, backfilling and compaction for underground electrical conduit.

Add the following paragraph for excess and waste material from excavations:
1.5 UTILIZATION OF EXCAVATED MATERIALS

Excess and unsatisfactory materials removed from trenching/excavations which cannot be used as backfill shall be hauled to a Government furnished disposal area which is located 2.2 miles upstream from the dam. Disposal is limited to native materials excavated (i.e. soil). All construction debris and trash is to be properly disposed of off-site by the Contractor

**DIVISION 16: ELECTRICAL**

**16263 Diesel-Generator Set Stationary 100 – 2500kW, with Auxiliaries**

SYSTEM DESCRIPTION

500 kW engine-generator set shall be provided and installed complete and totally functional, with all necessary ancillary equipment to include: air filtration; starting system; electrical system, protection and isolation; fuel system; cooling system; and engine exhaust system. This engine-generator set shall satisfy the requirements specified in the Engine-Generator Parameter Schedule.

Engine Generator Parameter Schedule

| | |
|---|---|
| Power Rating | Industrial |
| Standby Rating | 500 kW /625 kVA |
| Primary Rating | 425 kW / 531.25 kVA |
| Power Factor | 0.8 lagging |
| Engine-Generator Applications | stand-by power |

**16263 Diesel-Generator Set Stationary 100 – 2500kW, with Auxiliaries (Cont.)**

| | |
|---|---|
| Maximum Speed | 1800 rpm |
| Heat Exchanger Type | fin-tube (radiator) |
| Governor Type | Electric Isochronous |
| Frequency | 60 Hz |
| Voltage | 480 volts |
| Phases | 3 Phase, Wye |

**MATERIAL AND INSTALLATION**

**Engine-Generator Set Enclosure**

The engine-generator set enclosure shall be corrosion resistant and fully weather resistant. The enclosure shall contain all set components and provide ventilation to permit operation at Service Load under secured conditions. Doors shall be provided for access to controls and equipment requiring periodic maintenance or adjustment. Removable panels shall be provided for access to components requiring periodic replacement. The enclosure shall be capable of being removed without disassembly of the engine-generator set or removal of components other than the exhaust system. The enclosure shall reduce the noise of the generator set to within the limits specified in the paragraph SOUND LIMITATIONS

**Fuel Consumption**

Engine fuel consumption shall be rated at 100% of Power Rating.

| Size Range Net kW | % of Rated Output Capacity | Fuel Usage LBS./kWH |
|---|---|---|
| 300 - 999 | 75 and 100 | 0.575 |
| | 50 | 0.600 |

**Engine**

The engine shall operate on No. 2-D diesel fuel conforming to ASTM D 975, shall be designed for stationary applications and shall be complete with ancillaries. The engine shall be a standard production model described in the manufacturer's catalog. The engine shall be naturally aspirated, turbocharged - aftercooled. The engine shall be 2-cycle and compression-ignition type. The engine shall be vertical in-line, V- or opposed-piston type, with a solid cast block or individually cast cylinders. Each block shall have a coolant drain port. The engine shall be equipped with an overspeed sensor.

**16263 Diesel-Generator Set Stationary 100 – 2500kW, with Auxiliaries (Cont.)**

**Integral Main Fuel Storage Tank**

The engine shall be provided with an integral main fuel tank. The tank shall be factory installed and provided as an integral part of the diesel generator manufacturer's product. The tank shall be provided with connections for fuel supply line, fuel return line, local fuel fill port, gauge, vent line, and float switch assembly. A fuel return line cooler shall be provided as recommended by the manufacturer and assembler. The temperature of the fuel returning to the tank shall be below the flash point of the fuel. The engine-generator set provided with weatherproof enclosures shall have its tank mounted within the enclosure. The fuel fill line shall be accessible without opening the enclosure.

**Capacity**

The tank shall have capacity of 38 gallons per hour to supply fuel to the engine for an uninterrupted 24 hour period at 100% rated load without being refilled.

**Sound Limitations**

The noise generated by the installed diesel generator set operating at 100 percent load shall not exceed the following sound pressure levels in any of the indicated frequencies when measured at a distance of 23 feet (7 meter) from the end of the exhaust and air intake piping directly along the path of intake and discharge for horizontal piping.

| Frequency Band (Hz) | Maximum Acceptable Pressure Level (Decibels) |
|---|---|
| 63 | 85.7dBA |

**AUTOMATIC TRANSFER SWITCH**

Fully automatic operation shall be provided for engine-generator set starting and load transfer upon loss of normal source. Transfer switch shall be provided as part of the generator set and shall be in accordance with Section 16410 AUTOMATIC TRANSFER SWITCH AND BY-PASS/ISOLATION SWITCH.

## 16370 Electrical Distribution System, Aerial

### FIELD TESTS

General

Field testing shall be performed in the presence of the Contracting Officer. The Contractor shall notify the Contracting Officer 10 days prior to conducting tests. The Contractor shall furnish materials, labor, and equipment necessary to conduct field tests. The Contractor shall perform tests and inspections recommended by the manufacturer unless specifically waived by the Contracting Officer. The Contractor shall maintain a written record of tests, which includes date, test performed, personnel involved, devices tested, serial number and name of test equipment, and test results. Field reports will be signed and dated by the Contractor.

Ground-Resistance Tests
Operating Tests
Sag and Tension Test
Pre-energization Services
    Reclosures
    Switches

### MATERIALS AND INSTALLATION

Wood Poles;
Wood poles shall comply with ANSI O5.1, and shall be pressure treated in accordance with AWPA C4. Creosote preservatives shall not be used. Poles less than 50 feet in length, or classes 6 through 10, shall not be installed. Provision for communication services is required on the pole line. A vertical pole space of not less than 2 feet shall be reserved at all locations.

Conductors;
Medium-voltage line conductors of the ~~Spacer Cable~~ Tree Wire type shall be used; they shall be of the factory-assembled, messenger-supported type, having a rated circuit voltage of 15kV. Insulation shall be cross-linked thermosetting polyethylene (XLP) or approved equivalent conforming to all applicable ICEA specifications. Messengers shall be zinc-coated steel, aluminum-clad-steel, copper-clad-steel, or composite-copper and copper-clad steel. Conductor material shall be AAC, AAAC, or ACSR. Conductors shall be installed in accordance with manufacturer's approved tables of sags and tensions.

Aluminum materials;
Aluminum shall not be used in contact with earth or concrete. Connectors and splices shall be of copper alloys for copper conductors, aluminum alloys for aluminum-composition conductors, and a type designed to minimize galvanic corrosion for copper to aluminum-composition conductors.

Crossarms;
Crossarms shall comply with RUS Bull 1728H-701 and shall be solid wood, distribution type, except cross-sectional area with pressure treatment conforming to AWPA C25, and a 1/4 inch, 45-degree chamfer on all top edges. Cross-sectional area minimum dimensions shall be 4-1/4 inches in height by 3-l/4 inches in depth in accordance with IEEE C2 for Grade B construction. Crossarms shall be not less than 8 feet in length.

**16370 Electrical Distribution System, Aerial (Cont.)**

Medium-Voltage Line Insulators;
Insulators shall comply with NEMA HV 2 for general requirements. Suspension insulators shall be used at corners, angles, dead-ends, and other areas where line insulators do not provide adequate strength. Where angles are greater than 15 degrees, provide double-arm with dead-end insulator construction.

Guy Assemblies;
No more than two strengths of guys should be used on the project, and all guys will be sized for the maximum loading tension of the line wherever conductor tensions are not balanced, such as at angles, corners, and dead-ends. Any pole where the angle of deviation of the line exceeds five degrees will be guyed. Where a single guy will not provide the required strength, or more guys shall be provided. The maximum permitted angle of deviation for a single angle guy installation (one guy installed on the bisect of line angle) is 45 degrees. For greater angles, a down guy installation in line with each direction of pull is required.

Pole Line Hardware;
Pole-line hardware shall be hot-dip galvanized steel.

Grounding and Bonding;
Ground rods shall be 3/4 inch in diameter by 10 feet in length of the sectional type driven full length into the earth. The maximum resistance of a driven ground rod shall not exceed 25 ohms under normally dry conditions. Non-current-carrying metal parts of equipment and conductor assemblies, such as medium-voltage cable terminations and messengers, operating mechanisms of pole top switches, panel enclosures, recloser frames (cases) and other non-current-carrying metal items shall be grounded. Additional grounding of equipment, neutral, and surge arrester grounding systems shall be installed at poles in accordance with IEEE C2.

Recloser;
Automatic circuit reclosers shall comply with IEEE C37.60 and shall be vacuum type, complete with devices, attachments, and accessories required for installation and operation and shall be suitable for mounting on a single pole. Reclosures shall be equipped with ground fault tripping equipment. Surge arrester protection shall be provided. Reclosure shall be installed after the metering equipment. Recloser installation shall be in accordance with manufacturer's requirements.

Group-Operated Load Interrupter Switch;
Manually operated load interrupter switch shall comply with ANSI C37.32 and shall be of the outdoor, manually-operated, three-pole, single-throw type. Switch shall be non-fused and shall be complete with necessary operating mechanisms, handles, and other items required for manual operation from the ground. Switch shall be installed after the recloser and in accordance with manufacturer's requirements.

Surge Arrester;
Surge Arresters shall comply with NEMA LA1 and IEEE C62.1, IEEE C62.2, and IEEE C62.11, and shall be provided for protection of aerial-to-underground transitions and automatic circuit reclosers. Surge Arresters shall be properly sized for equipment protection.

## 16370 Electrical Distribution System, Aerial (Cont.)

Connections Between Aerial and Underground Systems;
Underground cables shall be extended up poles in conduit to cable terminations. Cables shall be supported by devices separate from the conduit near their point of exit from the riser conduit. Risers shall be equipped with bushings to protect cables.

Connections To Utility Lines;
Contractor shall coordinate all work related to the connection of the new lines to the existing overhead lines owned by Puget Sound Energy. Contractor shall be responsible for all fees associated with this work.

## 16375 Electrical Distribution System, Underground

FACTORY TESTS

Factory tests shall be performed, as follows, in accordance with the applicable publications and with other requirements of these specifications. The Contracting Officer shall be notified at least 10 days before the equipment is ready for testing

Transformers: Manufacturer's standard routine, design and other tests in accordance with IEEE C57.12.00.

Transformers rated 200 kVA and above: Reduced full-wave, chopped-wave, and full-wave impulse test on each line and neutral terminal, in accordance with IEEE C57.98.

FIELD TESTS

General;
Field testing shall be performed in the presence of the Contracting Officer. The Contractor shall notify the Contracting Officer 10 days prior to conducting tests.

Medium-Voltage Preassembled Cable Test;
After installation, prior to connection to an existing system, and before the operating test, the medium-voltage preassembled cable system shall be given a high potential test. Direct-current voltage shall be applied on each phase conductor of the system by connecting conductors at one terminal and connecting grounds or metallic shieldings or sheaths of the cable at the other terminal for each test. Prior to the test, the cables shall be isolated by opening applicable protective devices and disconnecting equipment. The method, voltage, length of time, and other characteristics of the test for initial installation shall be in accordance with NEMA WC 74 for the particular type of cable installed, and shall not exceed the recommendations of IEEE Std 404 for cable joints unless the cable and accessory manufacturers indicate higher voltages are acceptable for testing. Should any cable fail due to a weakness of conductor insulation or due to defects or injuries incidental to the installation or because of improper installation of cable, cable joints, terminations, or other connections, the Contractor shall make necessary repairs or replace cables as directed. Repaired or replaced cables shall be retested.

**16375 Electrical Distribution System, Underground (Cont.)**

MATERIALS AND INSTALLATION

Cable Terminating Cabinet;
Cable terminating cabinets shall be pad-mounted, hook-stick operable, deadfront construction conforming to the requirements of IEEE ANSI/IEEE C37.20.3, Category A. Cabinets shall be provided with 200A loadbreak junctions and elbow-type separable loadbreak connectors, cable parking stands, and grounding lugs.

Cables;
Medium voltage cables shall be soft drawn copper, single conductor type, Type MV rated for 15kV and shall have EPR insulation with 133 percent insulation level. Cables shall be rated for use in duct applications. Neutral conductors shall be of the same materials as the phase conductors.

Conduit and Ducts;
Concrete encased medium voltage ducts shall be Schedule 40; direct buried ducts and risers shall be Schedule 80. Ducts placed in roads shall be concrete encased.

Surge Arrester;
Surge Arresters shall comply with NEMA LA1 and IEEE C62.1, IEEE C62.2, and IEEE C62.11, and shall be provided for protection of aerial-to-underground transitions and transformers. Surge Arresters shall be properly sized for equipment protection.

Transformer;
Contractor shall provide two pad-mounted transformers. Each transformer shall be compartmental type, self-cooled, tamper resistant, loop-feed type suitable for use outdoors. The primary shall be dead-front construction with loadbreak switching; oil-immersed, current-limiting, bayonet-type fuses; medium-voltage separable loadbreak connectors; and surge arresters. It shall be of the sealed tank construction. Transformers shall have four 2-1/2 percent rated kVA high-voltage taps, two above and two below rated primary voltage. A tap changing mechanism shall be provided for accurate voltage adjustment without opening the transformer tank. The transformers shall be rated as follows:

KVA: 500KVA
Phase: 3-phase
Frequency: 60 Hz
Temp. Rise: $60^{o}$ C
Primary Voltage: 12470V-Delta
Primary BIL: 95kV
Secondary Voltage: 480-Wye
Secondary BIL: 95kV
Percent Impedance Voltage: 4.0
Coolant: Insulating oil

**16375 Electrical Distribution System, Underground (Cont.)**

KVA: 75KVA
Phase: 3-phase
Frequency: 60 Hz
Temp. Rise: $60^{o}$ C
Primary Voltage: 12470V-Delta
Primary BIL: 95kV
Secondary Voltage: 208-Wye
Secondary BIL: 95kV
Percent Impedance Voltage: 4.0
Coolant: Insulating oil

The transformer shall comply with the latest applicable standards of the National Electrical Manufacturers Association (NEMA) and the American National Standards Institute (ANSI).

Liquid Dielectrics;
Liquid dielectrics for transformers shall be non-polychlorinated biphenyl (PCB) mineral-oil or less-flammable liquid. Nonflammable fluids shall not be used. Tetrachloroethylene (perchloroethylene) and 1, 2, 4 tetrachlorobenzene fluids shall not be used. Transformer dielectric shall be less than 2 ppm PCB content.

Grounding and Bonding;
A ground ring consisting of bare copper conductors and ground rods shall be installed around pad-mounted equipment. Ground rods shall be installed at all manholes. Ground rods shall be 3/4 inch in diameter by 10 feet in length of the sectional type driven full length into the earth. The maximum resistance of any grounding system shall not exceed 25 ohms under normally dry conditions. Non-current-carrying metal parts of equipment, manholes, and conductor assemblies shall be grounded.

Connections To Buildings;
Underground cables shall be extended to the buildings and shall be connected to the first applicable termination point in each building. Exterior conduits shall interface with the stubout of the building's conduit system 5 feet outside the building.

**16410 Automatic Transfer Switch and By-Pass/Isolation Switch**

The Automatic Transfer Switch shall be electrically operated and mechanically held in both operating positions. It shall be suitable for use in standby systems and shall be provided as a component of the engine-generator-set.

**16475 Coordinated Power System Protection**

END OF SECTION